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CLAIMS

1. Receptor which has an amino acid sequence having more than 60% homology with the amino acid sequence shown in Figure 1.

2. Receptor according to claim 1, which has the amino acid sequence shown in Figure 1.

3. Receptor according to claim 1 or 2 having a preference for pyrimidine nucleotides over purine nucleotides.

4. Receptor according to claim 3, having at least a twofold preference, preferably tenfold to one hundredfold preference for pyrimidine nucleotides over purine nucleotides.

5. Receptor according to any of the claims 3 or 4, wherein the pyrimidine nucleotide is uridine triphosphate.

6. Receptor according to any of the claims 3 to 5, having a preference for UTP over UDP.

7. Receptor according to claim 5 being a high affinity UTP-specific receptor.

8. Receptor according to any of the preceding claims, belonging to the P2 receptor family.

9. Receptor according to any of the preceding claims, being a G protein-coupled receptor.

10. Receptor according to any of the preceding claims, being a human receptor.

11. Nucleic acid molecule encoding the receptor according to any of the preceding claims.

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12. Nucleic acid molecule according to claim 11, wherein the nucleic acid molecule is DNA or RNA molecule.

13. DNA molecule according to claim 12, which is a cDNA molecule or a genomic DNA molecule.

14. Nucleic acid molecule according to any of the claims 11 to 13, having more than 60% homology to the DNA sequence shown in Figure 1.

15. DNA molecule according to claim 14, which has the DNA sequence shown in figure 1.

16. Vector comprising the nucleic acid molecule according to any of the claims 11 to 15.

17. Vector according to claim 16, adapted for expression in a cell, which comprises the regulatory elements necessary for expression of the nucleic acid molecule in said cell operatively linked to the nucleic acid molecule according to any of the claims 11 to 15 as to permit expression thereof.

18. Vector of claim 17, wherein the cell is chosen among the group consisting of bacterial cells, yeast cells, insect cells or mammalian cells.

19. Vector according to any of the claims 16 to 18, wherein the vector is a plasmid or a virus.

20. Vector according to claim 19, being a virus selected from the group consisting of baculovirus, adenovirus or Semliki Forest virus.

21. Cell comprising the vector according to any of the claims 16 to 20.

22. Cell of claim 21, wherein the cell is a mammalian cell, preferably non neuronal in origin.

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23. Cell of claim 21, wherein the cell is chosen among the group consisting of COS-7 cells, LM(tk-) cells, NIH-3T3 cells or 1321N1 cells.

24. Nucleic acid probe comprising a nucleic acid molecule of at least 15 nucleotides capable of specifically hybridising with a unique sequence included within the nucleic acid molecule according to any of the claims 11 to ~~15~~.

25. Nucleic acid probe of claim 24, wherein the nucleic acid is DNA or RNA.

26. Antisense oligonucleotide having a sequence capable of specifically hybridising to a mRNA molecule of claim 12, so as to prevent translation of the mRNA molecule.

27. Antisense oligonucleotide having a sequence capable of specifically hybridising to the DNA molecule of claim ~~13~~.

28. Antisense oligonucleotide according to claim 26 or 27, comprising chemical analogs of nuclectides.

29. Ligand other than purine and pyridine nucleotides capable of binding to a receptor according to any of the claims 1 to ~~10~~.

30. Anti-ligand capable of competitively inhibiting the binding of the ligand according to claim 29 to the receptor according to any of the claims 1 to 10.

31. Ligand according to claim 29 which is an antibody.

32. Anti-ligand according to claim 30 which is an antibody.

33. Antibody according to claim 31 or 32, which is a monoclonal antibody.

34. Monoclonal antibody according to claim 33, directed to an epitope of the receptor according to any of the claims 1 to 10, present on the surface of a cell expressing said receptor.

35. Pharmaceutical composition comprising an amount of the oligonucleotide according to claim 26, effective to decrease activity of the receptor according to any of the claims 1 to 10 by passing through a cell membrane and binding specifically with mRNA encoding said receptor in the cell so as to prevent its translation, and a pharmaceutically acceptable carrier capable of passing through a cell membrane.

36. Pharmaceutical composition of claim 35, wherein the oligonucleotide is coupled to a substance which inactivates mRNA.

37. Pharmaceutical composition of claim 36, wherein the substance which inactivates mRNA is a ribozyme.

38. Pharmaceutical composition according to any of the claims 35 to 37, wherein the pharmaceutically acceptable carrier comprises a structure which binds to a receptor on a cell capable of being taken up by cell after binding to the structure.

39. Pharmaceutical composition of claim 38, wherein the structure of the pharmaceutically acceptable carrier is capable of binding to a receptor which is specific for a selected cell type.

40. Pharmaceutical composition which comprises an effective amount of the anti-ligand of claim 30, effective to block binding of a ligand to the receptor according to any of the claims 1 to 10 and a pharmaceutically acceptable carrier.

41. Transgenic non human mammal expressing the nucleic acid molecule according to any of the claims 11 to 15.

42. Transgenic non human mammal comprising a homologous recombination knockout of the native receptor according to any of the claims 1 to 10.

43. Transgenic non human mammal whose genome comprises antisense nucleic acid complementary to the nucleic acid molecule according to any of the claims 11 to 15 so placed as to be transcripted into antisense mRNA which is complementary to the mRNA of claim 12 and which hybridises to said mRNA thereby reducing its translation.

44. Transgenic non human mammal according to any of the claims 41 to 43, wherein the nucleic acid according to any of the claims 11 to 15 additionally comprises an inducible promoter.

45. Transgenic non human mammal according to any of the claims 41 to 43, wherein the nucleic acid according to claim 11 to 15 additionally comprises tissue specific regulatory elements.

46. Transgenic non human mammal according to any of the claims 41 to 45, which is a mouse.

47. Method for determining whether a ligand can specifically bind to a receptor according to any of the claims 1 to 10, which comprises contacting a cell transfected with a vector expressing the nucleic acid molecule encoding said receptor with the ligand under conditions permitting binding of ligand to such receptor and detecting the presence of any such ligand bound specifically to said receptor, thereby determining whether the ligand binds specifically to said receptor.

48. Method for determining whether a ligand can specifically bind to the receptor according to any of the claims 1 to 10, which comprises preparing a cell extract from cells transfected with a vector expressing the nucleic acid molecule encoding said receptor, isolating a membrane fraction from the cell extract, contacting the ligand with the membrane fraction under conditions permitting binding of the ligand to such receptor and detecting the presence of any ligand bound to said receptor, thereby determining whether the compound is capable of specifically binding to said receptor.

49. Method for determining whether a ligand is an agonist of the receptor according to any of the claims 1 to 10, which comprises contacting a cell transfected with a vector expressing the nucleic acid molecule encoding said receptor with the ligand under conditions permitting the activation of a functional receptor response from the cell and detecting by means of a bio-assay, such as a modification in a second messenger concentration or a modification in the cellular metabolism, an increase in the receptor activity, thereby determining whether the ligand is a receptor agonist.

50. Method for determining whether a ligand is an agonist of the receptor according to any of the claims 1 to 10, which comprises preparing a cell extract from cells transfected with a vector expressing the nucleic acid molecule encoding said receptor, isolating a membrane fraction from the cell extract, contacting the membrane fraction with the ligand under conditions permitting the activation of a functional receptor response and detecting by means of a bio-assay, such as a modification in the production of a second messenger, an increase in the

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receptor activity, thereby determining whether the ligand is a receptor agonist.

51. Method for determining whether a ligand is an antagonist of the receptor according to any of the claims 1 to 10, which comprises contacting a cell transfected with a vector expressing the nucleic acid molecule encoding said receptor with the ligand in the presence of a known receptor agonist, under conditions permitting the activation of a functional receptor response and detecting by means of a bio-assay, such as a modification in a second messenger concentration or a modification in the cellular metabolism, a decrease in the receptor activity, thereby determining whether the ligand is a receptor antagonist.

52. Method for determining whether a ligand is an antagonist of the receptor according to any of the claims 1 to 10, which comprises preparing a cell extract from cells transfected with a vector expressing the nucleic acid molecule encoding said receptor, isolating a membrane fraction from the cell extract, contacting the membrane fraction with the ligand in the presence of a known receptor agonist, under conditions permitting the activation of a functional receptor response and detecting by means of a bio-assay, such as a modification in a second messenger concentration, a decrease in the receptor activity, thereby determining whether the ligand is a receptor antagonist.

53. A method according to any of the claims 47 to 50, wherein the second messenger assay comprises measurement of intra-cellular cAMP, intra-cellular Inositol phosphate, intra-cellular diacylglycerol concentration or intra-cellular calcium mobilisation.

54. Method according to any of the claims 47 to 53, wherein the cell is a mammalian cell, preferably non neuronal in origin, and chosen among the group consisting of COS-7 cells, CHO cells, LM(tk-) cells, NIH-3T3 cells or 1321N1 cells.

55. Method according to any of the claims 47 to 54, wherein the ligand is not previously known.

56. Ligand detected by the method according to any of the preceding claims 47 to 55.

57. Pharmaceutical composition which comprises the ligand according to claim 56 and a pharmaceutically acceptable carrier.

58. Method of detecting the expression of the receptor according to any of the claims 1 to 10, by detecting the presence of mRNA coding said receptor, which comprises obtaining total RNA or total mRNA from the cell and contacting the RNA or mRNA so obtained with the nucleic acid probe according to claim 23 under hybridising conditions, and detecting the presence of mRNA hybridised to the probe, thereby detecting the expression of the receptor by the cell.

59. Method of detecting the presence of the receptor according to any of the claims 1 to 10 on the surface of a cell, which comprises contacting the cell with the antibody of claim 31 under conditions permitting binding of the antibody to the receptor, and detecting the presence of the antibody bound to the cell, thereby detecting the presence of the receptor on the surface of the cell.

60. Method of determining the physiological effects of expressing varying levels of the receptor according to any of the claims 1 to 10, which comprises

producing a transgenic non human mammal according to any of the claims 41 to 46 whose levels of receptor expression are varied by use of an inducible promoter which regulates the receptor expression.

61. Method of determining the physiological effects of expressing varying levels of the receptor according to any of the claims 1 to 10 which comprises producing a panel of transgenic non human mammals according to any of the claims 41 to 46, each expressing a different amount of said receptor.

62. Method for identifying an antagonist of the receptor according to any of the claims 1 to 10 capable of alleviating an abnormality in a subject wherein the abnormality is alleviated by decreasing the activity of the receptor, which comprises administering the antagonist to a transgenic non human mammal according to any of the claims 41 to 46 and determining whether the antagonist alleviates the physical and behavioural abnormalities displayed by the transgenic non human mammal as a result of receptor activity, thereby identifying the antagonist.

63. Antagonist identified by the method of claim 62.

64. Pharmaceutical composition comprising an antagonist according to claim 63 and a pharmaceutically acceptable carrier.

65. Method for identifying an agonist of the receptor according to any of the claims 1 to 10 capable of alleviating an abnormality in a subject wherein the abnormality is alleviated by activation of said receptor, which comprises administering the agonist to a transgenic non human mammal according to any of the claims 41 to 46 and determining whether the antagonist alleviates the

physical and behavioural abnormalities displayed by the transgenic non human mammal, the alleviation of the abnormalities indicating the identification of the agonist.

66. Agonist identified by the method of claim 65.

67. Pharmaceutical composition comprising an agonist according to claim 66 and a pharmaceutically acceptable carrier.

68. Method for diagnosing a predisposition to a disorder associated with the activity of a specific allele of the receptor according to any of the claims 1 to 10, which comprises :

a) obtaining nucleic acid molecules of subjects suffering from said disorder;

b) performing a restriction digest of said nucleic acid molecules with a panel of restriction enzymes;

c) electrophoretically separating the resulting nucleic acid fragments on a sized gel;

d) contacting the resulting gel with a nucleic acid probe capable of specifically hybridising to said nucleic acid molecule and labelled with a detectable marker;

e) detecting labelled bands which have hybridised to the said nucleic acid molecule labelled with a detectable marker to create a unique band pattern specific to subjects suffering from said disorder;

f) preparing nucleic acid molecules obtained for diagnosis by step a-e; and

g) comparing the unique band pattern specific to the nucleic acid molecule of subjects suffering from the disorder from step e and the nucleic acid molecule obtained for diagnosis from step f to determine whether the patterns are the same or different and to diagnose

thereby predisposition to the disorder if the patterns are the same.

59. Method of preparing the purified receptor according to any of the claims 1 to 10, which comprises :

a) constructing a vector adapted for expression in a cell which comprises the regulatory elements necessary for the expression of nucleic acid molecules in the cell operatively linked to nucleic acid molecule encoding said receptor so as to permit expression thereof, wherein the cell is selected from the group consisting of bacterial cells, yeast cells, insect cells and mammalian cells;

b) inserting the vector of step a in a suitable host cell;

c) incubating the cell of step b under conditions allowing the expression of the receptor according to the invention;

d) recovering the receptor so obtained; and

e) purifying the receptor so recovered, thereby preparing an isolated receptor according to the invention.